MANITOBA

Regional Development of Electronic Data Processing in Canada: The Role of the Federal Government

A DISCUSSION PAPER

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Introduction

In the past five years, the Government of Canada has taken major initiatives in the field of regional development. Through the creation of the Department of Regional Economic Expansion (DREE) and the development of related programs, Ottawa has attempted to assist in the more balanced regional development of Canada.

While many would argue whether some of the specific federal approaches have been the correct ones, Ottawa has at least recognized the problem of regional development as being one that deserves high priority and expenditures in the search for a solution.

It is with considerable regret, then, that the Government of Manitoba notes that in the federal programs for regional development, Ottawa has virtually ignored that sector of its own operations which can most easily be decentralized — the federal government's own electronic data processing (EDP) activities, and the EDP programs of the federal crown corporations.

Because of modern communications methods, computer centres for EDP can be located almost anywhere, even thousands of miles from the user of the services or the head office of the organization, with little or no functional difference in the operation or output of the centre. The computer centre's raw material is information; its finished product is information — and information can be transmitted electronically by cable, satellite or microwave. Information is thus almost completely freight-insensitive, and government centres for the electronic processing of information should head the list of agencies suitable for decentralizing into Canada's regions.

With the location of more computer centres in Canada's regions would come regional growth of the most desirable nature — high technology jobs, non-polluting industry, and the industrial and service spin-offs that flow from the creation of a "critical mass" of highly-skilled people in a particular location. These spin-offs include the establishment of sales and service offices in the regions by the large computer hardware companies, and new product and service ideas that often grow out of a number of skilled professionals working in close proximity.

To date, however, federal policies have looked at computers and regional development only as computer services relate to the development of other industries; the regional development of the data processing industry itself has not been pursued, even though it is most suited to such development.

The main impediment to the decentralization of computer centres across Canada to date has been the cost of computer/communications. With the introduction in the spring of 1973 of *Dataroute* by the Trans-Canada Telephone System, and *Infodat* by CN-CP Telecommunications, the cost of computer/communications took a quantum leap downward. Along with these reductions in cost have come considerable technical improvements in the computer/communications field. Thus, the cost of computer/communications can no longer be considered a major argument against locating more computer centres in Canada's regions.

Yet although the federal government has been actively encouraging reductions in computer/communications costs of the type introduced last spring, there have been no corresponding federal initiatives aimed at encouraging the development of computer centres in the regions generally, or the decentralization of federal government computer centres specifically.

This paper is an attempt to outline the scope of EDP activities in Canada, and in the federal government in particular, and to suggest possible policies that will lead to greater decentralization of computer centres.

Computer/Communications and Regional Development

In May 1972, the federal Department of Communications issued a two-volume document titled: *Branching Out: Report of the Canadian Computer/Communications Task Force.* [1] This was followed in April 1973 by a federal government "green paper" on computer/communications.[2]

Both documents give relatively little consideration to the question of the relationship between computers and regional development, and both give even less consideration to the question of the decentralization of the computer centres themselves.

The section on "Regional Aspects" in *Branching Out* takes less than three pages. It concentrates on the availability of computer services to industries which might wish to locate or operate in Canada's less-developed regions. The report asks:

> Are computing facilities a prerequisite for new industrial development, or do they tend to follow in the wake of such development? [3]

In response to this question, the authors of *Branching Out* believe that:

> The decision to locate an industrial or commercial enterprise does not at present seem to depend on the availability of and close proximity to computing facilities. There is no reason to suppose that the hardware and service supply segments do not respond to market demand as it materializes.[4]

The *Branching Out* report also asks:

> Will the increasing use of computer/communications technology in the future result in a greater centralization of computer facilities?[5]

This is a key question, and one which should be examined in some detail, both because of the indication it gives of future trends in the computer industry, and because it is important to understand clearly what is meant by "computer centralization."

Branching Out **answers the question in this way:**

> The factors which favour further *concentration of computer facilities** include: central processor economies of scale; availability of expertise; more economical and reliable data communications; and more advanced data bank management systems. Opposed to these are factors which mitigate the effects of centralization, such as: advantages of local service capabilities; less developmental time requirements; and the promise of spectacular gains in mini-computer technology.[6]

And the authors believe that, on balance,

> . . . it is unlikely that the pressures towards computing facility centralization will lessen.[7]

In many state and provincial governments, and in many large industries, there has been a growing trend to replace a number of small or medium computers with one or two large machines, tied to user/terminals through communications links. This trend to concentrate or centralize the computer hardware of an organization does not mean that such a concentration must take place in the same geographic location as the head office of the organization, or even in one of the locations which previously contained one of the smaller machines.

It is quite feasible for an organization to replace three medium-size computer centres, located in Winnipeg, Toronto and Montreal, with one larger computer centre, and to locate that new centre in one of Canada's regions, in a community like Brandon or Lethbridge.

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* Emphasis supplied.

Thus, it is important to remember that the concentration of a number of smaller computer centres into one larger, central computer facility within an organization, is in no way inconsistent with the decentralized geographical location of such concentrated facilities as they are formed. Indeed, the point in time at which such concentration takes place is often the ideal time to consider a regional location for the new computer centre. This is so because the creation of a concentrated larger facility usually involves a new physical location for the hardware, and the switching-over of previous smaller centres to some form of remote terminals.

Unfortunately, the *Branching Out* report does not appear to have considered this possibility. Although it recognizes the importance of the federal government's own data processing activities in terms of the industry as a whole, *Branching Out* still implicitly assumes that a "central" computer facility, which concentrates the work previously done by a number of smaller centres, must be located in a geographically central location. Thus, to the authors of *Branching Out*, decentralization of computing is assumed to be synonymous with the location of small or medium computer centres in various parts of the country. The geographic decentralization of concentrated computer centres which process information on a nation-wide basis — as a means of creating regional centres of data processing jobs across Canada — is hardly considered at all.

The EDP Industry in Canada

The electronic data processing industry in Canada is measured in the hundreds of millions of dollars, including the rental and purchase of hardware, salaries paid to computer personnel, the supplies required for computer centres, and the cost of computer/communications.

In the provision of hardware alone, the *Branching Out* report estimates the annual rental equivalent of computer systems in Canada at over $350 million in 1971.

Using the Canadian Computer Census for 1971, compiled by the Canadian Information Processing Society, the *Branching Out* report developed the figures summarized in Table 1.

TABLE 1. Geographic Distribution of Computers by Number and Annual Rental Equivalent: May 1971

	Total Systems Less Federal Government Departments		Federal Government Departments	
	Computers	Rental Equivalent	Computers	Rental Equivalent
B.C.	281	$ 21,910,000	13	$ 554,000
Alberta	280	24,147,000	7	187,000
Saskatchewan	74	5,401,000	—	—
Manitoba	149	15,289,000	2	138,000
Ontario	1,717	173,107,000	146	11,695,000
Quebec	759	88,366,000	16	2,590,000
New Brunswick	48	3,635,000	2	41,000
Nova Scotia	66	3,884,000	28	1,006,000
P.E.I.	3	102,000	—	—
Newfoundland	29	1,482,000	1	74,000
Yukon and N.W.T.	1	63,000	—	—

Source: *Branching Out*, page 47.

It can be seen from Table 1 that computer systems run by federal government departments are even more concentrated in Ontario than are computer systems generally. For all systems excluding federal government departments, 50.4 per cent of the computers are in Ontario, while for federal government departments, 67.9 per cent are located in Ontario.

The *Branching Out* report does not give a detailed breakdown of the location of computer systems operated by crown corporations of the federal government. However, the report does indicate the relative importance of the various sectors and institutions that own and use computers in Canada, and this is illustrated in Table 2.

TABLE 2. Distribution of Computers by Economic and Institutional Sector in Canada: May 1971

	Number of Computer Systems %	Value of Computer Systems %
Federal Government	5.9	4.6
Federal Government Crown Corporations	5.7	5.9
Provincial Governments	1.8	4.3
Provincial Government Institutions	2.8	4.2
Municipal	2.8	2.0
Schools and School Boards	2.5	1.5
Colleges and CEGEP's	3.5	1.8
Universities	10.0	10.3
Hospitals	1.6	0.9
Manufacturing	22.0	17.6
Service	11.7	7.6
Transportation	4.0	5.1
Service Bureaus	8.6	15.3
Agriculture	0.5	0.4
Construction	1.3	0.4
Finance	7.7	11.5
Forestry, Pulp and Paper	1.3	1.1
Mining	1.1	1.1
Other	5.2	4.4
TOTAL PUBLIC SECTOR	36.6	35.5
TOTAL PRIVATE SECTOR	63.4	64.5

Source: *Branching Out*, pages 48, 49.

The table shows that the federal government departments and crown corporations together account for 11.6 per cent of the number of computer systems in Canada, and 10.5 per cent of the value of computer systems in Canada, as at May 1971.

The *Branching Out* report points out that:

> . . . the federal government, as *the largest single user of computers and communications in Canada*,* can exert considerable leverage on the direction and rate of development of the industry through its operational policies.[8]

Because of the federal government's pivotal position in this field, it is important to examine the scope of federal government EDP activities in some detail.

* Emphasis supplied.

EDP in Federal Government Departments

The preceding tables have shown that federal government departments accounted for 5.9 per cent of the number of computer systems in Canada in 1971, and 4.6 per cent of the total Canadian annual rental equivalent. In numerical terms, this totalled 215 computer systems, and just over $16 million in annual rental equivalent.

While this gives a picture of federal government departmental use of computer hardware, it is just the tip of the iceberg in terms of determining the total federal departmental expenditure on electronic data processing.

A fuller picture of federal departmental data processing expenditures was presented in November 1971, in the *Report on Electronic Data Processing in the Federal Government of Canada.*[9] This report grew out of the EDP Policy Project of the Administrative Policy Branch of the Treasury Board Secretariat.

The Treasury Board report examined not only hardware costs, but the total EDP expenditures in federal government departments and agencies. It included in its survey the departments, and such agencies as Statistics Canada, and the Unemployment Insurance Commission, but not the large commercially-oriented Crown Corporations such as Air Canada or Canadian National Railways.

The report found that:

> . . . The total number of personnel in all classifications reported by departments as being directly involved with EDP was 5,000 in 1971-72. . . .
>
> The direct expenditure by departments and agencies of the government on EDP in 1971-72 will be $81 million. This cost includes equipment, directly related personnel, supplies and rental of commercial services. . . . With a continuation of the present organization of EDP, this expenditure would likely double in three years and reach $205 million by 1975-76.
>
> It has been estimated that for every dollar of such direct cost, another $2.50 is expended, primarily in related personnel costs in the development and on-going operation of computer-based projects. Adding this, the total current annual cost of the EDP universe is, therefore, of the order of $250 million. Assuming that the ratio of direct and related costs continues to apply, the total expenditure for 1975-76 will exceed $700 million.[10]

The figures given in the report include both the direct costs of EDP within the federal government, and also those direct costs which were incurred in the private sector. In 1971, it was estimated that direct costs incurred on external computing facilities (commercial and universities) were about $7 million of the $81 million total direct cost, or about 8.5 per cent.[11]

The Treasury Board report also indicated that in 1971-72, 22 of the 52 departments and agencies surveyed were operating 70 computer centres. (As already indicated, these 70 centres accounted for 215 computers.) The report estimated that without any change in federal government EDP policy, this would grow into 30 departments operating 82 computer centres by 1975-76.[12]

The Treasury Board report recommended a greater degree of central planning for EDP in the federal government, and the streamlining of computing into three main types of centres. It estimated that if its recommendations were followed, fewer departments would be operating fewer but larger computer centres in 1975-76, for a direct estimated saving of $30 million.

The figures are summarized in Table 3.

TABLE 3. EDP Growth in the Federal Government

	As surveyed in 1971-72	1975-76 estimate assuming no change in EDP policies	1975-76 estimate assuming adoption of Treasury Board policies
Number of departments operating computers	22	30	15
Number of departmental computing centres	70	82	45
Total number of EDP personnel	5,000	7,900	7,400
Direct cost of EDP	$ 81 million	$205 million	$175 million
Total direct and related costs of EDP	$250 million	$700 million	$600 million

Source: *Report on Electronic Data Processing in the Federal Government of Canada,* EDP Policy Project, Administrative Policy Branch, Treasury Board Secretariat, November 30, 1971. Pages 4, 5, 11.

It is worth repeating that the Treasury Board plan, if implemented, will result in a concentration of federal government computers into fewer but larger centres. This transition will result in the physical removal of computers from their present locations, and replacement of their functions by larger computers in new locations. However, there has been no indication from the federal government that regional locations for these new computer centres will be considered when the transition takes place.

Following the November 1971 Treasury Board report, the EDP Master Plan Project was set up within the Treasury Board, under the direction of Dr. W. Pajor. In December 1972, the working group on this project issued *The EDP Master Plan: An Action Plan for the Implementation of the Electronic Data Processing in the Federal Government.*[13]

Prior to the issuing of the report, Dr. Pajor, in a paper delivered in October 1972, noted:

> A new attitude is gradually emerging. It is no longer thought to be essential to have a computer on-site in order to get good service.[14]

Unfortunately, this reference appears to apply to the location of computer centres within the Ottawa area, and goes no further. The December 1972 EDP Master Plan continues the implicit assumption that if computers are to be concentrated into larger computer centres, that concentration is to take place in the Ottawa area. Yet there is no functional difference between the relationship of a user/terminal in a government building to a computer centre located in a suburb of Ottawa, or one located in a suburb of Winnipeg. The communications link is longer and more expensive, but the function is not altered appreciably.

EDP in the Federal Crown Corporations

Statistics for the federal crown corporations are not dealt with in great detail in *Branching Out,* but the report does note that the EDP activities of the Crown Corporations are roughly equal to the EDP activities of the departments and agencies. Generally, it appears that there has been little effort to date on the part of the federal government to apply any broad standards, such as regional development, to the EDP activities of its crown corporations.

The Manitoba experience with Air Canada is a good case in point. Air Canada presently operates computer centres in Winnipeg, Toronto, and Montreal. The airline is currently in

the process of setting up a major computer centre in Montreal, possibly capable of absorbing the functions of the centres in Toronto and Winnipeg. However, the airline has assured the Manitoba government that there will be no reduction in jobs at the Winnipeg computer centre.

Yet surely this does not answer the real questions: Why is a new centre being built in Montreal at all? Why are Air Canada's three computer centres not being concentrated into one new centre *located in one of Canada's less developed regions?*

It should be noted that in the United States, Eastern Airlines has its head office in New York City, yet its computer centres are located in North Carolina and in Florida. United Airlines has its head office in Chicago, yet its main reservations computer centre is in Denver.

Clearly, it would be possible for federal crown corporations like Air Canada to assist in the regional development of computer processing skills, with little or no effect on the function of their data processing systems.

The Costs of Decentralization of EDP Centres

If one accepts the premise that computer centres should be located in Canada's regions *as a source in themselves of a desirable form of regional growth,* two key questions emerge — the cost of communications links to users many hundreds of miles away, and the ability to attract skilled personnel outside Central Canada. Neither problem is so large to be beyond a reasonable solution.

As already noted, the cost of computer/communications has dropped markedly in recent months. Nevertheless, a computer centre's communications costs will increase somewhat if it is some distance from its main concentration of users.

With regard to communications costs for the federal government's own computing, and that of its crown corporations, it might be useful to consider the example of the purchasing policy of the federal Department of Supply and Services. In an effort to encourage purchasing of government requirements in all parts of Canada, that department does not include shipping costs in the price of some commodities when considering tenders from suppliers throughout Canada.

The relationship of shipping costs to delivery of a commodity is not unlike the relationship of communications costs to the delivery of EDP information. And in the latter case there is no time lag, as would be the case when commodities have to be shipped a great distance. EDP information travels at the speed of light.

Thus, it would be entirely consistent with existing federal policy in a related area if the federal government would eliminate communications costs from its consideration of the location of government computer centres. These costs, which are dropping in any event, would represent a reasonable input into the regional development of the data processing industry, just as the payment of shipping costs represents a reasonable input into regional growth of government suppliers of commodities.

In the case of regional development of computer centres in the private sector, it would seem reasonable that the Department of Regional Economic Expansion should have a major input. In this context it is worth noting one of the observations of the *Branching Out* report:

> . . . The normal pattern which exists, for the most part, in a modern computer/communications system is for a computer complex to be located in a firm's head office or major manufacturing facility, with computer terminals located in branch plants, sales offices, and warehouses across the country.[15]

Most regional economic expansion activities have concentrated on getting branch plants of one sort or another to locate in Canada's regions. It may turn out that from a functional and long-range economic point of view, it would make more sense to encourage the relocation of the central computer complexes themselves.

Therefore, development of specific DREE programs to assist with communications costs for computer centres which locate in designated regions, would appear to be in order.

This leaves the question of attracting skilled personnel outside of Central Canada. While this may be a problem in very remote locations, it certainly cannot be considered so in the major cities of the West and the Atlantic provinces. In fact, just the opposite problem exists — there are usually not enough jobs for the graduates of computer science courses at universities in these regions, and they are forced to move to Central Canada to find work.

Without question, most of the personnel requirements for future computer centres in the regions could be met easily by graduates of the universities and community colleges located in those areas.

It is true that some senior personnel might have to be transferred to new centres as they are established outside Central Canada, but here we must look at the example set by the Department of Regional Economic Expansion itself. DREE is in the process of transferring its personnel out of Ottawa, so that its ratio will change from 70 per cent Ottawa, 30 per cent regions, to 30 per cent Ottawa, 70 per cent regions. Since natural growth would account for a considerable amount of the EDP decentralization, relatively small staff transfers would be required between computer centres in Ottawa and the new ones in the regions.

Summary and Recommendations

The data processing industry is one of the fastest-growing and most important in Canada. Because of its nature, it is one of the most suitable industries for decentralization into Canada's less-developed regions. Decentralization of data processing could bring to the less-developed regions a source of highly-skilled jobs, and the related benefits that come from creating a "critical mass" of skilled people in a particular area.

Yet such decentralization will not take place if the present policy direction of the federal government is maintained, both in terms of data processing in general, and in terms of the federal government's own EDP activities.

It is recommended that:

1. The federal government should make regional development of the data processing industry a specific goal of regional development policy;

2. As new, concentrated computer centres are created for federal government departments and crown corporations, these new centres should be located in all regions of Canada;

3. The federal government should absorb computer/communications costs in connection with such decentralization in the same way as it absorbs shipping costs for some commodities in its purchasing policies;

4. DREE should develop programs to assist with computer/communications costs for EDP centres that locate in designated regions.

It is clear that such policies could result in the decentralization into Canada's regions of many millions of dollars of EDP activities and many thousands of jobs. It is crucial that such policies be considered quickly, however, since the transition to larger, concentrated computer centres is a current trend in both governments and the private sector, and it is during such a transition that a good case can be made for decentralization.

Therefore, the topic of computer decentralization should be made one of the top priorities in future federal-provincial discussions of computers and computer/communications.

Notes

1. *Branching Out: Report of the Canadian Computer/Communications Task Force.* Department of Communications, Ottawa. May, 1972. 2 vols. Hereinafter referred to as *Branching Out.*
2. *Computer/Communications Policy: A Position Statement by the Government of Canada.* Department of Communications, Ottawa. April, 1973. 17 pp. Commonly referred to as the "green paper" on computer/communications.
3. *Branching Out*, vol. 1, page 33.
4. *Branching Out*, vol. 1, page 34.
5. *Branching Out*, vol. 1, page 33.
6. *ibid.*
7. *ibid.*
8. *Branching Out*, vol. 1, page 170.
9. *Report on Electronic Data Processing in the Federal Government of Canada.* (EDP Policy Project. Administrative Policy Branch. Treasury Board Secretariat. November 30, 1971) 36 pp. Hereinafter referred to as *EDP Report – November 1971.*
10. *EDP Report – November 1971*, pages 4, 5.
11. As quoted in *Branching Out*, vol. 1, page 169.
12. *EDP Report – November 1971*, page 2.
13. *The EDP Master Plan: An Action Plan for the Implementation of the Electronic Data Processing Policy in the Federal Government.* (EDP Master Plan Project. Administrative Policy Branch. Treasury Board Secretariat. December 1972) 54 pp.
14. W. Pajor, Project Director, EDP Master Plan Project, Treasury Board Secretariat, in a paper presented to the First World Conference on Informatics in Government, October 16-20, 1972, in Florence, Italy.
15. *Branching Out*, vol. 1, page 33.